



**Infinite Possibilities: Profiles of Summer Research from  
The Gatton Academy of Mathematics and Science in Kentucky**

*Volume Six - Summer 2016*







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THE GATTON  
ACADEMY   
*of Mathematics and Science*

Infinite Possibilities:  
*Profiles of Summer Research from  
The Gatton Academy of Mathematics and Science in Kentucky*

**Volume Six - Summer 2016**



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## About the Gatton Research Internship Grant Program

The Gatton Academy of Mathematics and Science in Kentucky created the Gatton Research Internship Grant program in 2010. Made possible from a gift from Mr. Carol Martin “Bill” Gatton, the program offers grants to Gatton Academy students between their junior and senior years to support summer research internships across the Commonwealth, the USA, and the world. By providing funding, the program directly creates research internships that otherwise would not have existed for Gatton Academy students. In its first seven years, the program has created 111 research internships for Gatton Academy students to study STEM problems in their areas of interest in devoted, full-time research settings.

Each year, the research funded by the Gatton Research Internship Grant program yields significant outcomes for recipients. As examples, summer 2015 recipients of the Gatton Research Internship Grant were recognized by the Siemens Competition—the nation’s premier research program for high school students—as national semi-finalists (Harsh Moolani and Alexandra Wright), by the Barry M. Goldwater Scholarship (Kristen Pedersen), and by Germany’s DAAD RISE program (Eura Shin). Meanwhile, last summer’s Gatton Research Internship Grants resulted in 23 student-delivered presentations at conferences across the state and nation in the 2015-2016 academic year.

The Gatton Research Internship Grant program funded 16 rising high school seniors during summer 2016. The following pages feature these students.



Harsh Moolani



Alexandra Wright



Kristen Pedersen



Eura Shin



Dear Mr. Gatton,

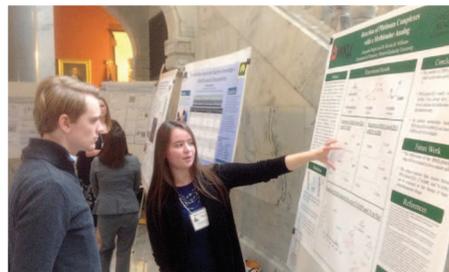
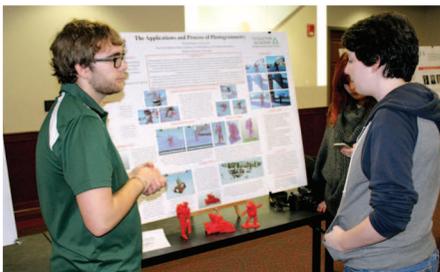
Your generosity sets an incredible example for our students. At The Gatton Academy, we hope to honor you by developing leaders who contribute to Kentucky and beyond in many ways. We strive to instill in them the commitment to community and service that you exemplify.

Our students are already beginning to contribute solutions to difficult problems. Through your generous support, they have had the opportunity to delve into mentored research in several fields. Students worked on topics related to gravity and space, gene mutations, fiduciary law, public health concerns, visual perceptions, autonomous aircraft systems, and wound healing, among others.

Students come to The Gatton Academy because of the enriching experiences we offer and the welcoming, supportive community of true peers. This is a place where they can be themselves in a community that not only accepts them, but greatly values their passionate pursuit of knowledge and excellence. Within this community, they relish research and study abroad opportunities which are beyond any they could access elsewhere.

You have our sincerest gratitude for supporting these bright minds and providing them a clear example of how to create a legacy that empowers others and supports the Commonwealth.

Sincerely,  
*Lynette Breedlove, Ph.D.*  
Director





**Matthew Biddle**  
Flaherty, Kentucky (Hardin County)

Dear Mr. Gatton,

You gave a cause a lot of money, and then that cause put your name on their building. This sentence sums everything up, right? Except it doesn't. Your gifts are more than just donations, more than money. Your gifts are the dreams of hundreds of kids. They are the belief that a difference can be made. Your gifts themselves are a lesson. Whenever I feel small and think I cannot do anything, I think about the name on the front of the building that I sleep in. The man to whom that name belongs did something. He did that something so that I could do something, and I plan to do something that impacts people positively, too.

People wake up every single day knowing they are not safe. They could die from dehydration, starvation, or disease. I want to help. I want to become a doctor or a medical researcher and help people every day of my life with my work. I want to do something that changes lives.

My research right now could help plants that would not usually be able to survive in certain conditions to thrive in those similar conditions. While I do not expect to solve world hunger, if my research this summer goes well, I could potentially continue it to use mycorrhizal fungal implementation as a growth agent. Such knowledge could be applied firsthand to supply families who do not know where their next meal is coming from with a healthy garden.

This is thinking very big, but if being at Gatton has taught me one thing it has taught me to think big.

Thank you so much for these amazing opportunities, Mr. Gatton,  
*Matthew Biddle*





*“This research experience fits into my professional goals as I aspire to be a professional researcher. This is first-hand job experience for what I hope to be doing for the rest of my life.”*

*“In the next ten years I want to do something that helps others. I plan to dive into the world with good intentions and a strong work ethic and see something changed because of them.”*

*“If someone asked me if they should apply to the Academy, I would tell them that it has been the most difficult and most rewarding experience of my life. ‘Hard work beats talent when talent doesn’t work hard.’ Well, here at the Academy, the talent and the hard work come together and the people who come from this place are unstoppable.”*

## **Matthew Biddle**

### **Home High School:**

Elizabethtown Independent High School

### **Research Area:**

Biology

### **Career Goal:**

Researcher

### **Research Mentor:**

Dr. Martin Stone  
WKU Department of Agriculture

### **Extracurricular Activities:**

Y-Club, Code ETown, Students Against Destructive Decisions, and Football



**Karthik Boyareddygari**  
Bowling Green, Kentucky (Warren County)

Dear Mr. Gatton,

I am currently a rising senior at The Gatton Academy, and I am engaged in a research project through the Gatton Research Internship Grant. Ever since I heard about The Gatton Academy in middle school, I was interested in being a student at the school. I saw it as a way to pursue my interests and better sample what life in the real world is like. Now, it has grown to be much more than that to me. Of all the things that Gatton is to me, the ones that have words/phrases that I can connect are: home, safe-haven, opportunity, discussion group, and cocoon.

I come from Warren County. In this county, we are fortunate to have good schools. However, I was still running out of classes to take. This meant that I would have been forced to take lower-level courses. Because of your gift, I was able to directly start applying my potential.

Furthermore, I have been encouraged to pursue research. To sum up what my mentor and I are trying to accomplish, we are investigating various electrochemical techniques to quantify the content of Humic Acid (a substance correlated to the efficacy of composted fertilizers) in soil samples. There is a technique that is effective, but it is plagued with environmental concerns due to its large Mercury use. In the end, both my experiences at the school and my summer research would not have been possible without the opportunities you have created, and for that I do sincerely thank you.

Sincerely,  
*Karthik Boyareddygar*

## **Karthik Boyareddygari**

### **Home High School:**

South Warren High School

### **Research Area:**

Analytical Electrochemistry

### **Career Goal:**

Mathematics Professor or  
Medical Researcher

### **Research Mentor:**

Dr. Stuart Burris  
WKU Department of Chemistry

### **Extracurricular Activities:**

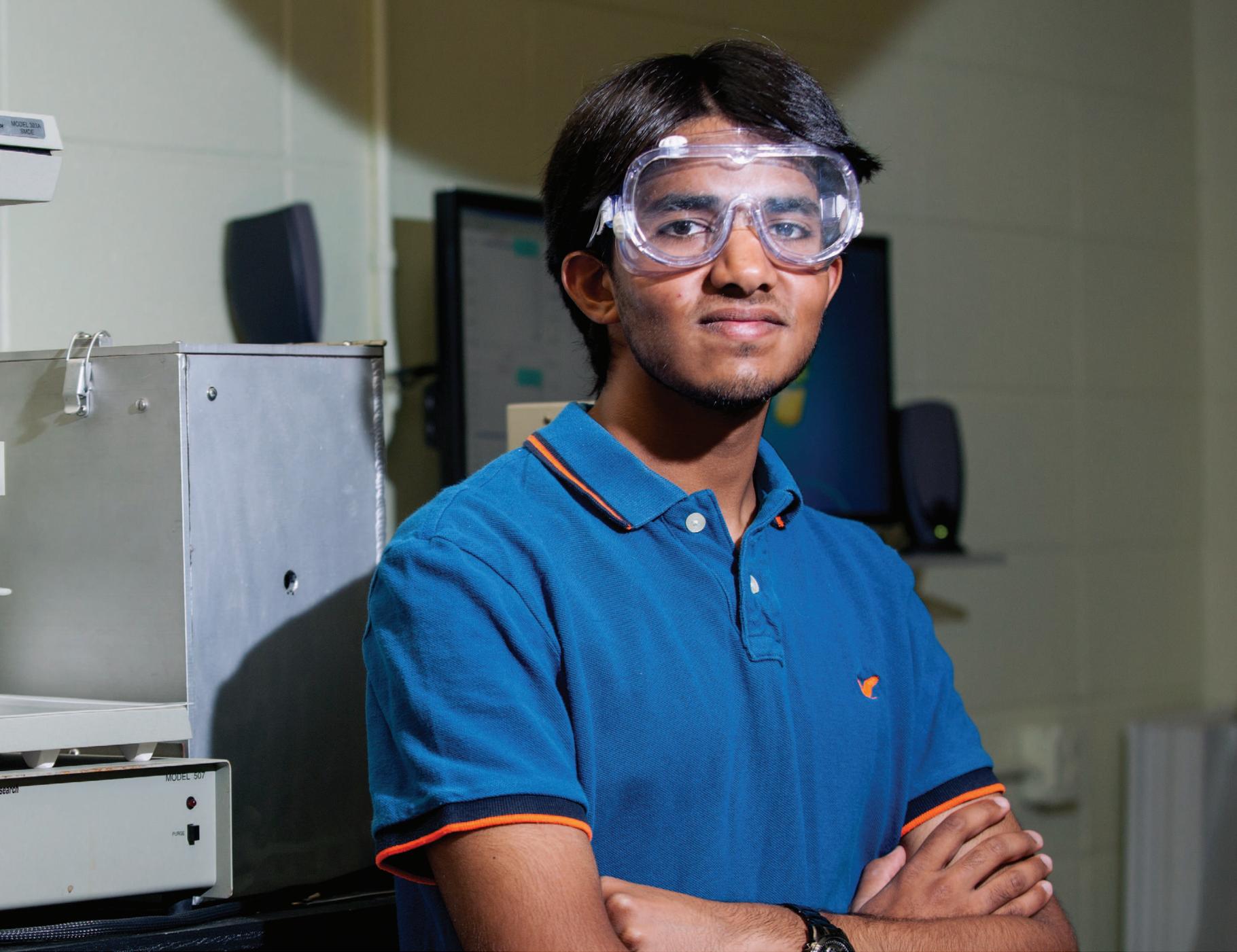
Boy Scouts, Academic Team,  
Taekwondo, Science Club, Science  
Bowl, Cooking Club, Beta Club,  
Sierpinski Performing Arts Club,  
Band (Bassoon and Contrabassoon),  
and Marching Band (Clarinet)

*“This research internship fits my educational goals by teaching me how to carry out detailed studies on a topic that I have committed myself to studying. In my area of study, I am learning to use lab equipment that I will continue to use in future courses. In fact, one of my courses in the fall semester is a lab-heavy analytical chemistry class, so the experience that I am accruing this summer will be of immediate use.”*

*“What I love most about Gatton is the community that I live within on a daily basis. I like how close we are simply due to our shared experiences.”*

*“On the first day of Gatton, I was still trying to see which preconceptions that I had were true and which ones were not. I went in expecting a group of hyper-competitive teenagers who had agendas to fulfill. Now, I know that we are simply high-achieving teenagers who happen to want to take advantage of that and have the means to do so now because of the school.”*







**Kat Brown**  
Louisville, Kentucky (Jefferson County)

Dear Mr. Gatton,

I was initially interested in The Gatton Academy because I wanted to have new experiences. I wanted to be challenged both academically and personally, and I wanted to take myself out of my comfort zone to have an adventure. My favorite challenge the Academy has offered was the ability to travel to Costa Rica and China on study abroad. I tried my best to understand and adapt to the starkly different cultures. The Gatton Academy has thoroughly delivered on all of these wishes.

My journey from home to Gatton has been surprisingly smooth, and I feel supported in accomplishing my goals. This year, I began doing research in astrogeology, studying tectonic faulting on Mars. The experience has been enlightening, and I have learned a lot about Mars, geology, the scientific process, and myself. During the year, I've already presented my research at three conferences, including the National Conference for Undergraduate Research in North Carolina. I am grateful for the opportunity to continue my research into the summer and write a paper for publication. Through this experience, I have already developed a much stronger work ethic and the ability to work on my own. I hope these skills, and more, will continue to grow through the summer.

Thank you,  
*Kat Brown*





*“I am really looking forward to publishing my work that I’ve done this summer. My mentor and I are submitting our paper for publication in a variety of journals.”*

*“My biggest accomplishment at the Academy is presenting my research at the National Conference for Undergraduate Research in Asheville, N.C. I was so proud that I could be both accepted to the conference and put together a nice, professional presentation.”*

*“My favorite Gatton Academy memory is laying out on the beach at Goldring-Gund Marine Biology Station in Costa Rica on study abroad with my peers and soaking in the stars. The sky was so clear!”*

## **Kat Brown**

### **Home High School:**

duPont Manual High School

### **Research Area:**

Geology

### **Career Goal:**

Something Creative and Impactful!

### **Research Mentor:**

Dr. Nahid Gani

WKU Department of Geography  
and Geology

### **Extracurricular Activities:**

Gay Straight Alliance, Venture Club, Film Club, Gatton Academy Miscellaneous Musicians Association, and Disc Jockey for WKU’s Radio Station, 91.7 Revolution



**Amber Carroll**  
Russellville, Kentucky (Logan County)

Dear Mr. Gatton,

Words cannot begin to explain how thankful we all are for your generous gifts to The Gatton Academy. Your gifts to us have changed our lives for the better. You have given all of us the opportunity to pursue our dreams and accomplish things we originally would not have been able to at our sending high schools. I think I speak for most of us when I say that we come from high schools where research was just a myth. At my home high school, we did not perform any experiments whether it was in biology, chemistry, or even physics. The way that we learned in school was from a book. This is not how the real world works. When you apply for a job or an internship, you cannot simply say that you read about an experiment when the employer asks about your experience in the field.

With your gift, we gain experience. It teaches us lifelong lessons. Research teaches so much more beyond what we study. We learn how to cooperate with others, balance multiple tasks, and have patience. All of these things are essential for our future. Thank you from the bottom of my heart for helping extraordinary students meet their full potential. Thank you for giving us experience, and thank you for helping us become successful. We could not have done this without you.

Thank you,  
*Amber Carroll*





*“The coolest thing about summer research is living with my best friends. When I come back from being in a lab all day, we all hang out together. Seeing each other have a passion for research and being able to share the experience together is unforgettable.”*

*“The biggest change I have experienced in my first year at the Academy is acting with greater independence. The change happens so fast that I hardly even realized it. I honestly sometimes forget that I am only 17 because Gatton makes one grow and mature so quickly.”*

*“I did research during my first year at The Gatton Academy in the Genome Discovery and Exploration Program. I had never worked in a lab before, nor had I performed any type of laboratory procedures. I loved working in a wet-lab setting. For this reason, I decided to seek summer research with Dr. Rodney King.”*

## **Amber Carroll**

### **Home High School:**

Logan County High School

### **Research Area:**

Biology

### **Career Goal:**

Orthopedic Surgeon

### **Research Mentor:**

Dr. Rodney King

WKU Department of Biology

### **Extracurricular Activities:**

Club Volleyball, Envirothon, Quiz Bowl, Avatar, Research, and Tutoring



**Reese Danzer**  
Crittenden, Kentucky (Boone County)

Dear Mr. Gatton,

I originally attended a small town, independent school in northern Kentucky. My parents learned about The Gatton Academy while I was in seventh grade. Five years later here I am, about to kick off my senior year with an English class in England (because why not?). Your school has had a major impact on me. I belong now. I've matured faster, and I am learning on a higher level. I know that friends I have made here will last my entire life. I get to spend my summer at a hospital doing research on epilepsy—something that the average Kentucky high school student only dreams of.

Your generosity allows me and hundreds of other Kentucky students to take advantage of opportunities like the Gatton Research Internship Grant to gain necessary hands-on experience, contribute to society later, and raise hope for our generation. Thanks to you, I have gained competitive skills. You are helping put Kentucky on the leading edge of American education. You have given me and other Kentucky students a chance at a better life.

Thank you,  
*Reese Danzer*

## **Reese Danzer**

### **Home High School:**

Walton-Verona Independent  
High School

### **Research Area:**

Neurology

### **Career Goal:**

Undecided

### **Research Mentor:**

Dr. Christina Gross  
Cincinnati Children's Hospital  
Medical Center,  
Division of Neurology

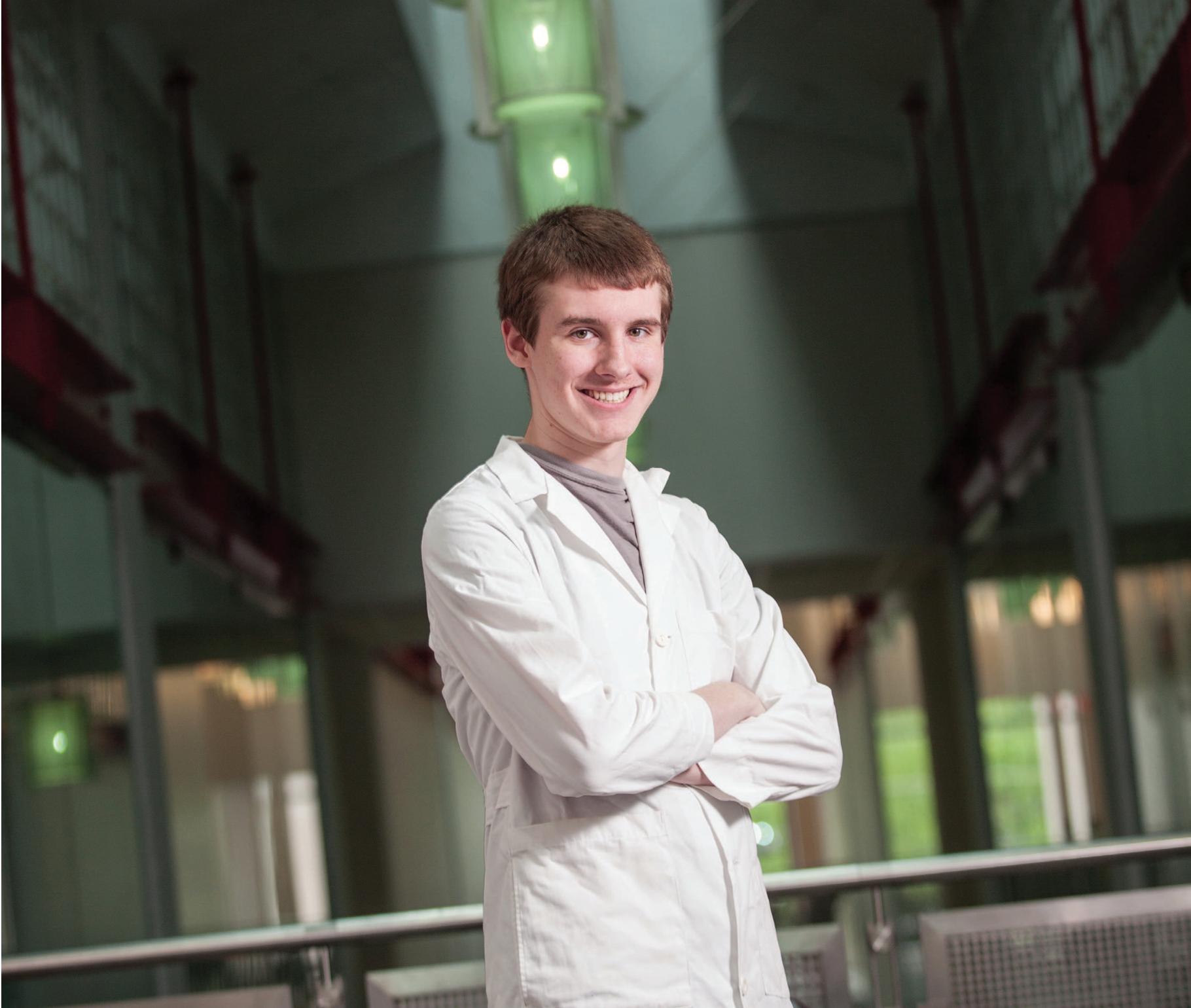
### **Extracurricular Activities:**

Quiz Bowl, Gatton Academy  
Miscellaneous Musicians Association,  
Trombone, Yearbook Club, Beta Club,  
Video Production, Tennis, and Cross-  
Country

*“My research is different from what a normal high-school student does in that I am working full-time in a position most people cannot access until they are upperclassmen in college. It is an amazing opportunity that will help me in my future, no matter what career path I choose.”*

*“I love Gatton’s community. You have the same bonds and relationships that you do in high school, except with the maturity that comes with being in college. It’s a wonderful way to transition between the two.”*

*“On my first day at Gatton, I was shy and apprehensive, thinking I would not fit in. And for a while, I didn’t. I was an oddball, drifting from group to group and not feeling like I belonged anywhere. Today, however, Gatton is my second home. I would not lose my place here for the world.”*





**Dylan Daugherty**  
Madisonville, Kentucky (Hopkins County)

Dear Mr. Gatton,

I don't think the words "thank you" can really express how grateful I am for the experiences you have helped me reach. Because of your generosity, I am able to excel in my academic and social pursuits. In just the past year I have learned everything from how to classify mutual funds to how to throw a Frisbee. I never thought that I would have been given the opportunity to fly to Philadelphia for an investment conference. The Academy has nurtured my interests outside of the classroom, too. I am able to tutor kids every week, play intramural sports with all of my friends, and take club trips. These experiences have helped to fuel my growth not only as a student, but as a person as well.

This summer I am studying fiduciary law. My mentor and I are making a calculator that estimates the total fees and costs associated with mutual fund trading. This tool can be used by financial planners to determine the best investments for their clients. At my home high school I was not even offered business classes, but here I have already taken advanced courses in financial planning. Even though we have never met, you are an inspiration to me. I felt as if you never forgot where you came from, giving back to the community that helped you accomplish the things that you have done. You built a bridge for youth like me, whose feet must pass your way. Thanks to you, the burden of a higher education has been lifted off my family. From the bottom of my heart, thank you for all you have done.

Sincerely,  
*Dylan Daugherty*





*“Instead of spending my summer soaking up the sun like most of my friends, I am trying to soak up as much knowledge as I can. I would not replace the experience I am having right now with anything else.”*

*“The research that I am doing this summer puts me in the front seat for one of the biggest changes of my field of interest. Hopefully the work I am doing now will be used to benefit my colleagues for years to come.”*

*“Very few high school students get access to quality business classes. Not only have I taken college-level business courses in addition to my STEM classes, but I am able to do a research project that sets me apart from everyone else in the world. It has been a humbling process. I’ve realized that what I know now barely scratches the surface of the wealth of information out there.”*

## **Dylan Daugherty**

### **Home High School:**

Madisonville North Hopkins High School

### **Research Area:**

Finance

### **Career Goal:**

Private Equity

### **Research Mentor:**

Dr. Ron Rhoades  
WKU Department of Finance

### **Extracurricular Activities:**

Future Business Leaders of America, Stock Market Club, Frisbee, Basketball, Soccer, Gattton Academy Leaders in Education (GALE), Tutoring, and Y-Club



**Evan Kessler**  
Bowling Green, Kentucky (Warren County)

Dear Mr. Gatton,

The Gatton Academy has always seemed like the dream school to me. I live in Bowling Green, and my dad works on campus, so I have known about The Gatton Academy ever since it opened. I have also known Dr. Julia Roberts for as long as I can remember, so I had many chances to hear all about this wondrous place throughout my childhood. This means that for me, being able to come here was a dream come true. Of course, Gatton has been a bit of a challenge. Coming in, I did not really think it would be as hard as the staff told us it would be. I did not think I needed to talk to professors or ask questions, and that was very apparent in my grades my first semester. But, since I had a chance to learn that first semester, shape up, and then step up to the challenge, I had a much stronger second semester.

Now that my first year is over, I can keep up the hard work through my psychology research. My research looks at how emotions affect people's decisions when presented with a dilemma in the form of a short passage or a video. This research, as well as my entire experience at The Gatton Academy, has taught me how to work hard, make new friends, and find out what I am really interested in. I cannot thank you enough for this opportunity, Mr. Gatton!

Sincerely,  
*Evan Kessler*

**Evan Kessler**

**Home High School:**

Bowling Green High School

**Research Area:**

Moral Judgmental Psychology

**Career Goal:**

Psychiatrist/Counseling Therapist

**Research Mentor:**

Dr. Pitt Derryberry

WKU Department of Psychology

**Extracurricular Activities:**

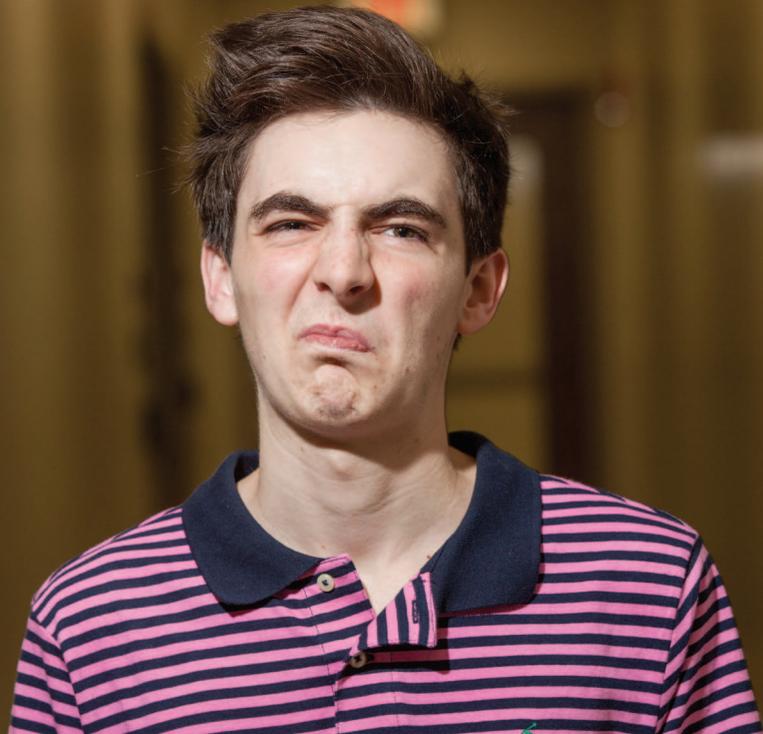
Intramural Soccer and

Psychology Research

*“The biggest challenge in my research has been all the reading. I have done an intense amount of reading source material for my own written introduction. Yet, the best advice my mentor has given me is to read. It is one of the most important things a researcher must do to successfully write an original research paper.”*

*“This experience is one of the best ways to delve into the field I am interested in. Plus, it is really nice to see firsthand what the work is like and whether I want to stay with it or not.”*

*“On my first day at Gatton I was pretty nervous, but still open to do whatever I needed to do to get a groove going in this brand new environment. Now, needless to say, I’ve never felt more at home with a group of people in my entire life.”*





**Sherafghan Khan**  
Hopkinsville, Kentucky (Christian County)

Dear Mr. Gatton,

I wanted to thank you so much for giving all of us the opportunity to be at The Gatton Academy and all that it has to offer to our Commonwealth. My name is Sherafghan Khan, and I was fortunate to receive a Research Internship Grant thanks to your generosity. This grant allowed me to live at Vanderbilt University in Nashville, Tenn., the summer after my junior year at the Academy, while doing something I am extremely passionate about. I am working with a structural biologist to understand the mechanism of how a deadly bacteria (*C.difficile*) infects humans. Thanks to you, I have the opportunity to do something I am eager about and on a topic that impacts millions of people across the nation. This summer internship is paving the way for many of my future aspirations.

I had originally heard about The Gatton Academy from a friend of mine who was attending the school. From the moment I heard about it, I knew I wanted to come here. The opportunities that you and the Gatton staff have provided us are beyond belief. This haven of higher learning truly embraces Kentucky's unbridled spirit and helps mark our state on the map. When I was presenting my research at a conference in New York, I was explaining to students from different STEM schools across our nation the concept behind Gatton. They were astonished that we were going to complete around 60 college credit hours as high school students. I am truly proud to call myself a Kentuckian and a student of The Gatton Academy.

Thank you, Mr. Gatton,  
*Sherafghan Khan*

## **Sherafghan Khan**

### **Home High School:**

University Heights Academy

### **Research Area:**

Structural Biochemistry

### **Career Goal:**

Neurosurgeon/Researcher for  
Neurodegenerative Disorders

### **Research Mentor:**

Dr. Borden Lacy  
Vanderbilt University  
School of Medicine,  
Department of Pathology,  
Microbiology, and Immunology

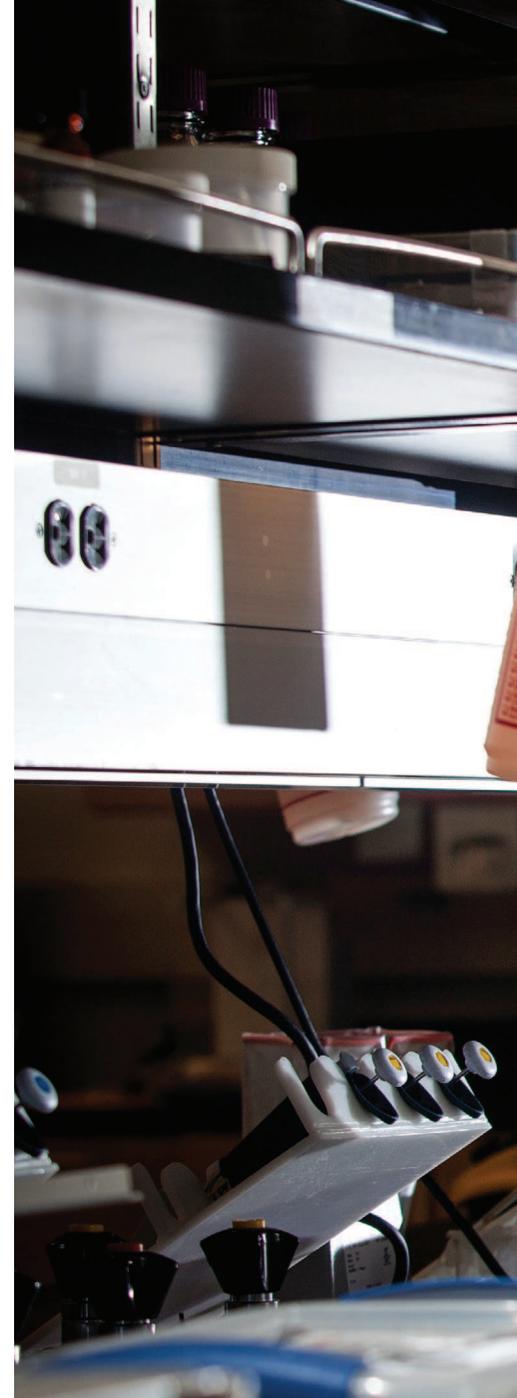
### **Extracurricular Activities:**

Science Bowl, Cultural Club, Gatton  
Academy Leaders in Education  
(GALE), Key Club, Intramural  
Soccer, Hospital Volunteer, Research,  
and Study Abroad

*“I plan on using my summer research for immediate competitions such as Siemens, Intel, and Goldwater. However, in a long-term point of view, I will use the experiences that I will acquire in the laboratory setting this summer as a step toward future research aspirations.”*

*“I would like to pursue an M.D.-Ph.D., meaning that I would like to merge the gap between patient care and scientific research. A long-held goal of mine is to aid in Alzheimer’s research by studying the structure of different underlying proteins involved in the disease. My research this summer fits into these professional goals.”*

*“As a young STEM researcher in the state of Kentucky, research means everything to me. I have been involved in one or more research projects every semester at The Gatton Academy. For me, research is the future. It is what will find the cure for cancer, the next cybersecurity system, and much more.”*







**Jonathan Kinnard**  
Hopkinsville, Kentucky (Christian County)

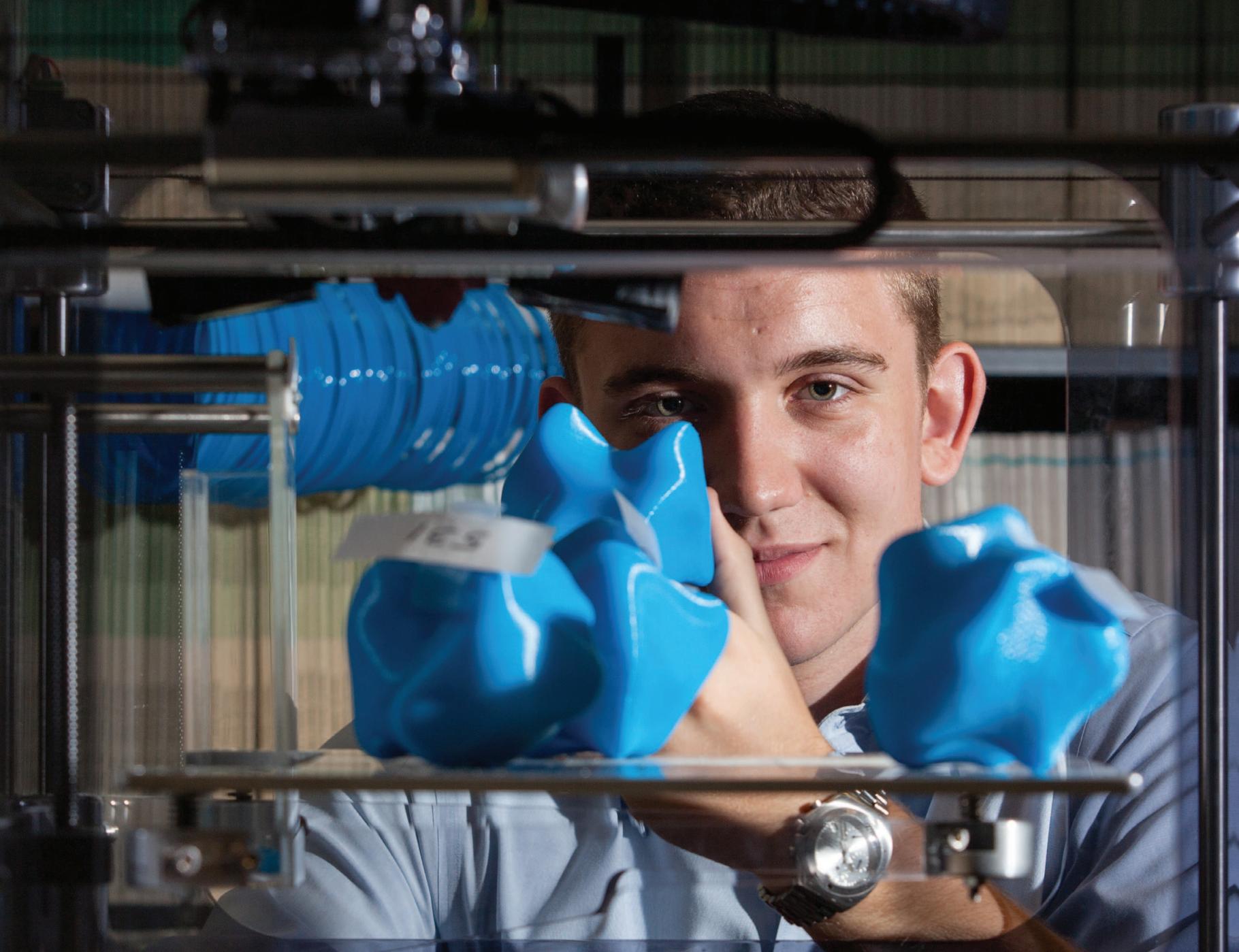
Dear Mr. Gatton,

My roommate and I took a picture with you last May at Florence Schneider Hall when you came to give a speech on the expansion of The Gatton Academy. We keep that picture taped to our door to remind us to be generous every day. Your selflessness has given me the opportunity to contribute to research that matters and begin to make a name for myself in the scientific community.

The research I am now part of will be a step forward in understanding the complexity of the human mind and how it processes haptic and visual information. This will improve visual robotics, the study of perception, and much more. We are pushing the bounds of what scientists around the world understand to be the conventional model of haptic and visual discrimination. I have found it easy to work long hours knowing how fortunate I am to be conducting this research.

I am the youngest of four children, and all my siblings are jealous of the head start The Gatton Academy has given me to work toward a career in electrical engineering. Working under Dr. Farley Norman in the Department of Psychological Sciences has opened my eyes to the interdisciplinary nature of research and the tsunami of applications for electrical engineering skills. I could not wait to work on a research project, and because of you, I didn't have to.

Thank you,  
*Jonathan Kinnard*





*“On my first day at The Gatton Academy, I felt a little stressed. It’s amazing how much I’ve changed since coming. Now, I feel much more prepared to take on the world. I still feel a little stressed, but I think that’s just a symptom of productivity.”*

*“The Gatton Academy’s influence on Kentucky goes beyond assisting the students admitted into the Academy. When I was in Italy on a Gatton study abroad program, I talked to Italians about Gatton in casual conversation. One such Italian on a train ride to Florence told me he had no idea Kentucky placed so much emphasis on education.”*

*“Finding a researcher that has years of experience in his field who is willing to mentor you is like striking gold in your backyard. Not many undergraduate students, let alone high school students, get this opportunity. I see this internship as a means of learning what a textbook can never teach.”*

## **Jonathan Kinnard**

### **Home High School:**

University Heights Academy

### **Research Area:**

Psychology

### **Career Goal:**

Electrical Engineer

### **Research Mentor:**

Dr. Farley Norman  
WKU Department of  
Psychological Sciences

### **Extracurricular Activities:**

Y-Club, Future Business Leaders of America, Forensics, National BETA Club, and Key Club International



**Aaron Kirtland**  
Crestwood, Kentucky (Oldham County)

Dear Mr. Gatton,

I am a student from Oldham County, Ky. I toured The Gatton Academy with my parents in eighth grade, just one year after moving from Alexandria, La. At the time, I loved mathematics and was being introduced to science, and I knew from then on that I wanted to attend The Gatton Academy. Thankfully, I was accepted and have since made an effort to take advantage of all the opportunities The Gatton Academy has to offer. My favorite opportunity came from studying Mandarin in the STEM + Chinese program. I was able to visit China with several of my classmates and study their renewable energy usage and meet bright high school students from another country. Study abroad opportunities like this were completely new to me.

This summer, I am researching drone flight algorithms with Dr. Adrian Lauf at the University of Louisville. I am excited for the opportunity because of the recent developments in drone flight and swarm control, and the importance of these topics for future developments in transportation and military missions. Therefore, I am thankful to have the opportunity to work on these topics for an entire summer.

In my free time, I enjoy coding Android applications and working on software projects with others. I am hoping that the research I complete this summer will help me decide whether I wish to pursue theoretical computer science research or computer engineering, two competing options for me. I am also hoping that my summer research will allow me to reach for future research goals such as publishing papers.

Sincerely,

*Aaron Kirtland*

## **Aaron Kirtland**

### **Home High School:**

South Oldham High School

### **Research Area:**

Computer Science

### **Career Goal:**

Computer Scientist

### **Research Mentor:**

Dr. Adrian Lauf  
University of Louisville,  
Department of Computer  
Engineering and Computer Science

### **Extracurricular Activities:**

Boy Scouts, Sierpinski Performing  
Arts Club, Band, Gatton Academic  
Leaders in Education (GALE),  
Robotics, and Beta Club

*“My favorite Gatton Academy memory so far has been meeting other students from around the world. On a study abroad trip to China in March, I was able to meet students at top high schools and see how many ideas span different cultures. The students I met have remained my friends and represent to me how similar people are despite their different conditions.”*

*“The thing I love most about The Gatton Academy is how it introduces students to so many different opportunities that are unavailable at their home schools. From internships to college visits to starting clubs to study abroad, the availability of these resources shows students how many opportunities are in their reach and allows them to be more confident in reaching out in college.”*

*“In the spring semester, I studied pedestrian detection with Dr. Qi Li in the Department of Computer Science at WKU. As a result, I was able to present at two research conferences, opportunities I could not have even considered at my home school.”*





**Logan Parker**  
LaGrange, Kentucky (Oldham County)

Dear Mr. Gatton,

I cannot thank you enough for making The Gatton Academy a reality for so many students, including myself. I am a first-generation college student, so this experience has been shared with my family with a lot of gratitude and excitement. I am from Oldham County, which is right outside of Louisville.

Gatton has allowed me to have many firsts within my first year of being here. I flew in a plane for the first time, which was also the first time that I left the country. I studied abroad in Costa Rica and China. These trips sparked my interest in studying abroad, which led me to becoming a Study Abroad and Global Learning Student Representative. In this WKU role, I advise and help other students with their future and current study abroad experiences. I have met people and seen places that were previously unknown to me, which is a gift that cannot be repaid.

I was challenged by my classes for the first time. Before coming here, my classes were all fairly easy; Gatton has pushed me to a greater work ethic and helped me to explore my way of thinking. With my Gatton Research Internship Grant, I am able to conduct research for the first time. My research is in the field of chemical engineering. I am combining a type of solar cell with a new chemical to improve its photocatalytic ability. This research has allowed me to explore the field of chemistry, helping me to decide which career path I might pursue. It has shown me everything I am capable of doing. Going to Gatton has shaped me into who I am today.

Sincerely,  
*Logan Parker*





*“The biggest challenge I’ve had in my research is overcoming my old way of thinking to do one task at a time. My mentor has taught me to work on multiple things simultaneously. My research requires a lot of work, so I have learned to balance multiple tasks at the same time to allow for better efficiency.”*

*“A lot of people think of Kentucky as a lesser state, but it takes them by surprise when they visit and see everything that we have to offer. It is always nice seeing the reaction on people’s faces when you tell them that the best high school in the country is in Kentucky. Gatton proves that amazing people live in Kentucky, and we have a lot to offer.”*

*“The opportunities that Gatton offers are what I love most about the Academy. I would have never been able to participate in research, study abroad, or take classes that I am interested in if I was back home.”*

## **Logan Parker**

### **Home High School:**

Oldham County High School

### **Research Area:**

Chemical Engineering

### **Career Goal:**

Undecided

### **Research Mentor:**

Dr. Yan Cao  
WKU Institute for Combustion  
Science and Environmental  
Technology

### **Extracurricular Activities:**

Cross Country, Track and Field,  
Study Abroad Student Representative,  
Project Pengyou, Y-Club, Gatton  
Academy Leaders in Education  
(GALE), Key Club, and Chinese Club



**Ayush Prasad**  
Flatwoods, Kentucky (Greenup County)

Dear Mr. Gatton,

Thank you for funding my summer research experience. I was lucky to learn about The Gatton Academy in time for the application process when I attended The Center for Gifted Studies' VAMPY camp the summer after my freshman year. After hearing about the unique experiences and opportunities at the Academy, I was immediately set on applying during my sophomore year. Although I live about five hours away from the Academy, my parents also realized how special the Academy was for me, and they supported me throughout the application process. When I got accepted into The Gatton Academy, I was excited for the possibilities that lay ahead.

After completing my first year at the Academy, I look back at it filled with good memories. I enjoyed playing intramural sports like basketball and tennis, hanging out with my friends, and choosing from a wide range of coursework for classes. However, research has become my favorite part of the Academy, and it was one of the main reasons why I wanted to come in the first place. I had always wanted to do research in mathematics or biology. At the Academy, I was able to discover research in an interdisciplinary field, mathematical biology. This summer, I'm continuing my research from the school year at the National Institute for Mathematical and Biological Synthesis at the University of Tennessee-Knoxville. I am furthering a mathematical model describing the process of wound healing with the goal of being able to use it for patients to individualize their treatment. Once again, thank you for the opportunities you have provided for me and my peers. I can assure you that your gifts will greatly impact Kentucky's future.

Sincerely,  
*Ayush Prasad*

## **Ayush Prasad**

### **Home High School:**

Russell High School

### **Research Area:**

Mathematics/Biology

### **Career Goal:**

Physician (Cardiologist)

### **Research Mentor:**

Dr. Richard Schugart

National Institute for Mathematical  
and Biological Synthesis,  
University of Tennessee-Knoxville

### **Extracurricular Activities:**

National Science Bowl, Gatton  
Academy Leaders in Education  
(GALE), and Intramural Sports  
(Tennis, Basketball, Table Tennis, and  
Ultimate Frisbee)

*“I have always been interested in mathematics and biology, but I never knew an interdisciplinary field existed until I came to the Academy. As an aspiring physician, I am fascinated by the idea of studying biological systems from a mathematical standpoint. This summer internship experience allows me to pursue this research alongside the brightest scientists in the mathematical biology field.”*

*“My biggest accomplishment at the Academy was being able to present my research during my first semester at a national conference. I was excited to be able to present so early in my Academy career, and I had an amazing time at my first research conference.”*

*“My seniors helped me so much throughout my junior year at the Academy. I credit their advice since the first day for my success. As a senior, I look forward to helping out the juniors the same way my seniors did with my class.”*





**Emma Reed**  
Fort Thomas, Kentucky (Campbell County)

Dear Mr. Gatton,

First of all, I would like to say thank you! I am so excited to be working on research this summer. I discovered I liked computer science my first semester at Gatton. From that point, I wanted to take on a large coding project. I wanted to do something that mattered. I read about a company called GoldiBlox that created toys that encouraged girls to tinker and become engineers. “There’s my project,” I thought. I wanted to create an app that taught girls computer science in a fun way.

I grew up in a family that loved to create things. My sister and I designed and built a small desk last summer, and we have built many other creations along the way. For example, I designed and sewed my Winter Formal skirt at the Academy this past year. The pride in my skirt can be seen in my photos. Creating computer programs requires similar ingenuity.

Gatton has challenged me to be more creative and innovative. There are days that test my abilities. There are also triumphs and opportunities that I will carry with me for the rest of my life. I am eagerly awaiting returning to my Academy home with a Grade-A research paper from summer in hand.

Thank you,  
*Emma Reed*

## **Emma Reed**

**Home High School:**  
Highlands High School

**Research Area:**  
Computer Science and  
App Development

**Career Goal:**  
Engineering

**Research Mentor:**  
Dr. Maureen Doyle  
Northern Kentucky University,  
College of Informatics

**Extracurricular Activities:**  
Debate, Yearbook, Chinese, Cooking,  
and Volunteering

*“I am excited for the classes I will take and the places I will travel in my second year at the Academy. I will take some really cool classes including Anatomy and Physiology and more Computer Science. I am also really excited to go on adventures with my friends. I am hoping to travel to Greece and China in the coming year.”*

*“One of the coolest things I accomplished at Gatton was participating in an undergraduate English conference. It really says something about a school that even as I study science and math, I still have opportunities in the humanities, too.”*

*“As a young woman in STEM, it’s really important to get girls interested in Computer Science. I had always thought of Computer Science as something unimaginative and scientific. Instead, I have discovered that it takes out-of-the-box thinking and creativity to create a good program. I hope that all girls can experience this through my app.”*







**Sara Saeed**  
Louisville, Kentucky (Jefferson County)

Dear Mr. Gatton,

Before coming to The Gatton Academy, whenever I was asked what I wanted to do with my life, I always confidently responded that I was going to become a physician. At the time that seemed like the most logical answer. It took one week at The Gatton Academy and two biology lectures to realize I had no interest in becoming a doctor. Instead, I found what I truly enjoyed in my first computer science lecture.

I dedicated more time than necessary perfecting my code and looked forward to attending those classes. I chose to apply for a Gatton Research Internship Grant to further explore this field. I am studying variations of the Josephus permutation problem with Dr. James Gary in the WKU Department of Computer Science. Thanks to you, I have been able to find and explore the field I truly enjoy and dedicate a summer to studying it. If I were still at my sending high school, I would not have discovered my love for coding.

The Gatton Academy has given me the resources and opportunities to explore a variety of fields and find the one I hope to eventually have a career in. Completing a research project this summer has given me an immense amount of confidence and experience in my research area that I cannot thank you enough for.

Sincerely,  
*Sara Saeed*





*“The biggest challenge I have faced in my research is knowing when to ask for help. It took time for me to realize that it is okay to not know what I was doing. I have realized that my research mentor is there for me.”*

*“Research has given me the opportunity to explore STEM fields outside of the classroom. I’ve been given the opportunity to learn in an undergraduate setting and study what I am truly interested in. Being able to do a computer science project like this would have been nearly impossible at my sending high school.”*

*“I love that at The Gatton Academy you can knock on your neighbor’s door at any time of night and get help with that chemistry concept or calculus problem you’ve been struggling with. We have a culture where asking for help is encouraged, and we have endless resources within our building.”*

## **Sara Saeed**

### **Home High School:**

duPont Manual High School

### **Research Area:**

Computer Science/Mathematics

### **Career Goal:**

Software Engineer

### **Research Mentor:**

Dr. James Gary  
WKU Department of  
Computer Science

### **Extracurricular Activities:**

Y-Club, Outside Your Bubble, Key Club, Club Lacrosse, and Stock Market Club



**Tricia Thompson**  
Owensboro, Kentucky (Daviness County)

Dear Mr. Gatton,

I want to start off by saying something I know you hear a lot, but we all sincerely mean: thank you. When I first heard about the Academy at SCATS the summer before my 8th grade year, I knew that I desperately wanted to go, but I could never have imagined how much it would change me. Coming from a small, private, Catholic high school in Owensboro, it was a long and scary process to first convince my parents to allow me to apply and then face the idea of living with this large group of strangers. I never would have thought that I had so much more to learn, both academically and personally. Thanks to the Academy, I have grown so much, from knowing how to take a derivative and solve problems in Mathematica to learning more about the struggles the LGBTQ+ community faces and when to ask for help.

On top of everything else, I'd like to thank you for providing a gift to fund the Gatton Research Internship Grant program. Because of this grant, I am able to stay on campus and study the chemical make-up of planetary nebulae (where stars form) and learn the history of now-gone stars to discover more about the history of the Milky Way itself. It is research that I love doing and that's helping me learn about what exactly I enjoy about astronomy. So, thank you again for all of the opportunities you have given me. I appreciate it more than you will ever know.

Thank you,  
*Tricia Thompson*

## Tricia Thompson

### Home High School:

Owensboro Catholic High School

### Research Area:

Astronomy

### Career Goal:

Astrophysicist or  
Computer Programmer

### Research Mentor:

Dr. Ting-Hui Lee  
WKU Department of Physics  
and Astronomy

### Extracurricular Activities:

Science Bowl, Gatton Academy  
Leaders in Education (GALE),  
Owensboro Catholic High School  
Academic Team, and Research

*“My research is not only teaching me theoretical modeling from observational data, but it also is teaching me how to use UNIX for our data processing. This could prove really helpful in later college classes or professional work.”*

*“The biggest change that I’ve found since coming to Gatton was the broadening of my experience, which sounds a bit cliché, but it’s true. I didn’t realize until I came to the Academy exactly how homogeneous the mindset of most people I knew was. Meeting people at the Academy made me think about issues and events from perspectives I had never considered.”*

*“If I were talking to prospective applicants to the Academy, I would tell them that it’s not like high school, and it doesn’t really try to be. You sacrifice some of those ordinary high school relationships and experiences, like hanging out at lockers and attending pep rallies, for extraordinary ones, including taking incredible classes, meeting a new family, and discovering the tips and tricks of more independence. In the end, you don’t regret it one bit.”*







**Olivia Urso**  
Glencoe, Kentucky (Gallatin County)

Dear Mr. Gatton,

I would like to thank you so much for this fantastic opportunity. Coming from a small rural county in northern Kentucky, I never would have had the chance to conduct research without your generosity.

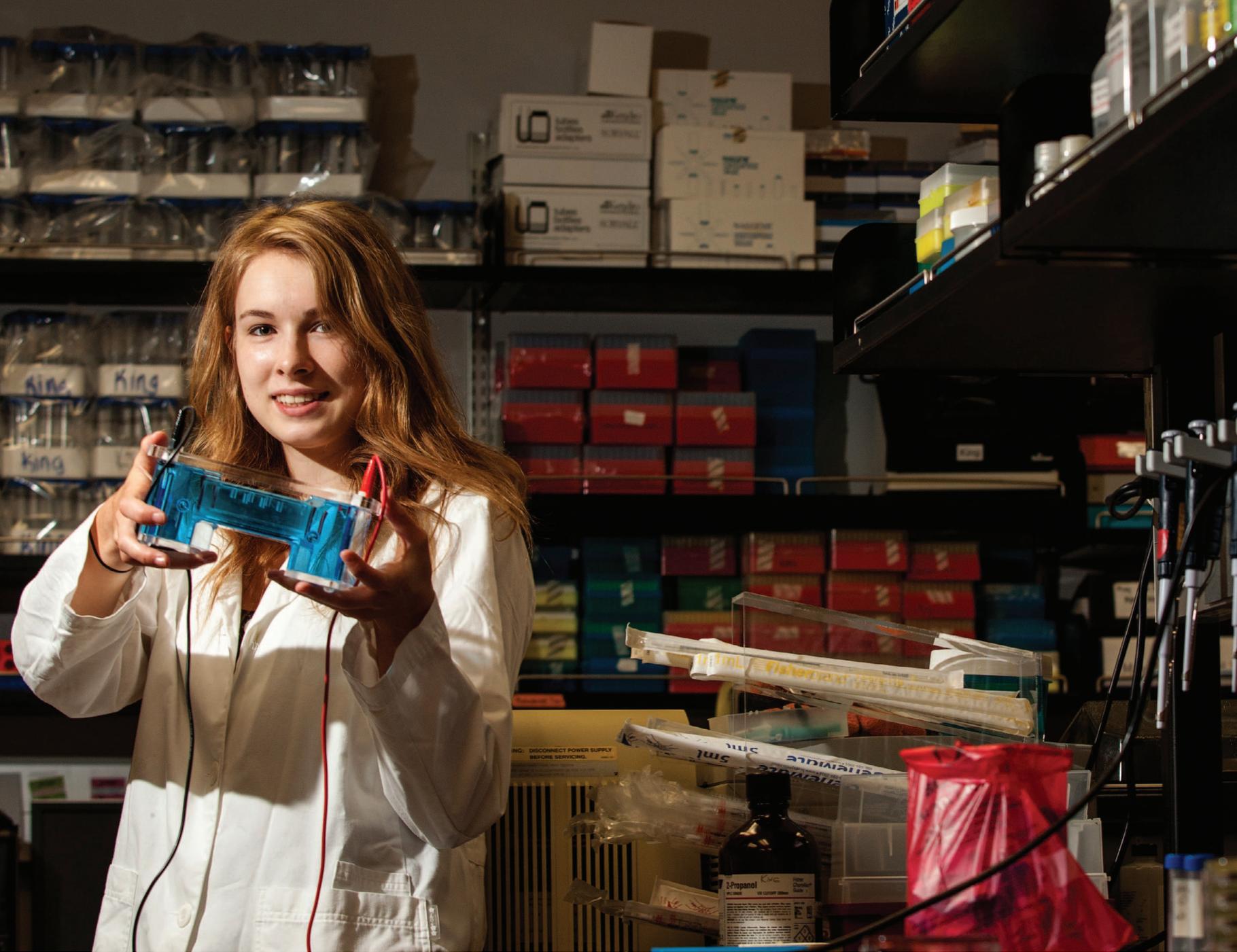
When a teacher first mentioned bacteria and microorganisms in an elementary school classroom, the idea fascinated me. These tiny creatures seemed so foreign, yet I was told they surrounded me constantly. As I continued through middle school, my curiosity grew. If these strange tiny organisms were as diverse as the animals I could see, then there must be endless possibilities for their use.

This summer, I am investigating just that: a way to genetically engineer bacteria to maximize usefulness. I am using a new genetic engineering technique, recombineering, to alter genes in strains of *E. coli*.

I cannot envision a more productive and enjoyable summer than staying at WKU and conducting research. Had it not been for this opportunity, I likely would have spent the summer working a mundane job earning minimum wage and passing the hours by watching the clock tick. Instead, I am excited to start the workday, and I often stay in the lab way past work hours to continue my experiments. I am truly passionate about the research I am conducting.

Coming into The Gatton Academy, my main goals were to find out what career I wanted to pursue and to take advantage of all of the opportunities I was presented. My research internship has helped me accomplish both, and I cannot be more grateful.

Thank you again,  
*Olivia Urso*





*“The biggest challenge I have had to overcome in my research is understanding what has been done previously on the project.”*

*“The first day of Gatton, I was definitely scared, to say the least. I was scared of leaving, scared of saying goodbye to my friends and family, scared of being responsible for myself, the list goes on. I’m not going to lie; I am still scared sometimes. However, I now greet being scared with determination and a plan. Being scared motivates me to work harder, adjust to my environment, and be the best person I can be.”*

*“I participated in the Genome Discovery and Exploration Program my first semester at the Academy. I researched Microbiology, specifically bacteriophages, under Dr. King, who is also my current research professor. I learned that despite diligence and precision, your experiment may not go as planned. However, diligence and precision allow you to adjust and redo your experiment, yielding results you can work with.”*

## **Olivia Urso**

### **Home High School:**

Gallatin County High School

### **Research Area:**

Microbiology

### **Career Goal:**

Medical Researcher

### **Research Mentor:**

Dr. Rodney King

WKU Department of Biology

### **Extracurricular Activities:**

Gatton Academy Leaders in

Education (GALE) and

Microbiology Research





*“I love the people and the potential at The Gatton Academy. Bringing this many brilliant people together is bound to reap amazing rewards.”*

- Matthew Biddle

*“Being a part of this program taught me a lot about myself.”*

- Amber Carroll

*“To me, research means making the world a better place by advancing science. I love being able to assist in adding to the collective knowledge of humanity.”*

- Kat Brown

*“What I love most about Gatton is the community. We all start off as just some group of juniors from all across Kentucky, but we end up being each other’s best friends.”*

- Evan Kessler

*“Research to me is a valuable opportunity to give back. It allows me to not just do something I am interested in, but to contribute something new and worthwhile to the world.”*

- Logan Parker

*“Research is an opportunity. Research is an outlet to ask a difficult question and have the capability to answer it.”*

- Olivia Urso





